

Diagnosis and Treatment of Dementia in the Aged

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Dementia affects an estimated 5 percent of the population 65 years of age and older, with 20 percent being affected at 75 years or older. Although the most common forms, primary degenerative and multi-infarct dementia, currently lack specific treatments, it is estimated that a thorough diagnostic evaluation will uncover a treatable cause in 10 percent to 20 percent. The differential diagnosis includes benign senescent forgetfulness, depression, adjustment disorder, paranoid states, amnesic syndrome, delirium, drug effects, systemic illnesses and intracranial conditions. The approach to each patient involves a history, physical examination, mental status evaluation and laboratory tests that focus on identifying treatable conditions. When no specific treatments are available, however, symptomatic treatments, including pharmacotherapy, environmental management, family supports and psychotherapy, can offer relief for both patients and their families and improve the daily functioning of the elderly patient with dementia.

DEMENTIA IS A nonspecific clinical syndrome with an organic cause characterized by global deterioration of intellect, cognition, behavior and emotions, without impairment of consciousness.¹ Of the 24 million persons 65 years of age and older in the United States today, about 3 million have acquired intellectual impairment sufficiently severe to warrant the diagnosis of dementia.²⁻⁴ The estimated

prevalence increases from about 5 percent at age 65 to 20 percent at age 80.^{5,6} Usually, these patients suffer from dementias for which no specific treatments are available. There are, however, many causes for which specific treatments do exist, and the diagnosis of primary dementia should therefore not be made without sufficient evidence. For example, Smith and Kiloh⁷ recently evaluated 200 patients admitted to a psychiatric hospital in Australia with the provisional diagnosis of dementia and reported that 13 of them (7 percent) had potentially reversible causes for this disorder; another 20 patients (10 percent) were found to have depressive pseudodementia. Although no large-scale epidemiologic studies have as yet determined the prevalence of reversible dementia in the aged, data from small samples suggest that

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ABBREVIATIONS USED IN TEXT

EEG = electroencephalogram

MSQ = Mental Status Questionnaire

10 percent to 20 percent of demented persons 65 years and older have potentially reversible disorders.⁸⁻¹¹

Definition

Table 1 lists the diagnostic criteria for dementia, according to the third edition of the *Diagnostic and Statistical Manual* of the American Psychiatric Association (*DSM-III*).¹² In summary, there are five criteria: (1) loss of intellectual ability resulting in social or occupational impairment, (2) memory impairment, (3) impairment in abstract thinking, judgment, other higher cortical functions or a personality change, (4) clear state of consciousness and (5) documented or presumed evidence of an organic cause. These criteria differ from earlier ones in several ways. First, the diagnosis is based on purely behavioral phenomena. Dementia, therefore, characterizes a clinical syndrome, a cluster of signs and symptoms which, in turn, must lead to a search for causative factors. Second, these criteria, unlike earlier ones, avoid reference to reversibility, duration and rate of onset. This departure from prior definitions may be a wise one. Reversibility and duration as criteria are difficult to apply because they can only be established retrospectively. Moreover, they are functions of knowledge current at any one time. Similarly, the rate of onset of illness as a criterion presents difficulties because not all dementias begin insidiously; for example, dementia due to anoxia may have an acute onset, yet may be clearly characterized by the *DSM-III* criteria.

Clinical Syndromes

Primary Degenerative Dementia

Primary degenerative dementia (Alzheimer's disease) accounts for an estimated 50 percent of the dementias of old age.¹³ The illness generally has an insidious onset and occurs in women more frequently than in men.¹⁴ The patient initially experiences varying degrees of memory loss, difficulty in learning new material, confusion and irritability. Later, disorientation, deterioration of personality and loss of ability to perform activities of daily living follow. As brain degeneration progresses, aphasia, agnosia and apraxia appear,

along with severe deterioration of higher cognitive functions. Signs of cortical release are often prominent and can be demonstrated by the grasp, glabellar, palmomental, snout and sucking reflexes.¹⁵ The end result of the dementing process is inanition and death, commonly from bronchopneumonia. Psychological responses include depression, suspiciousness, belligerence, paranoid ideas, agitation, hypochondriasis, anxiety, social withdrawal and emotional lability.

Several authors have reported family data on genetic influences in the development of this form of dementia.¹⁶ Chromosome abnormalities, HLA (human leukocyte antigen) type and haptoglobins may also be important.¹⁷ Slow virus, metals (such as aluminum) and neurotransmitter abnormalities have all been proposed as causative factors but definitive data are lacking.

Primary degenerative dementia is by no means limited to the "presenile" period of life. Both pathologically and clinically, the presenile and

TABLE 1.—*Diagnostic Criteria for Dementia**

- A loss of intellectual abilities of sufficient severity to interfere with social or occupational functioning.
- Memory impairment.
- At least one of the following:
 - (1) impairment of abstract thinking, as manifested by concrete interpretation of proverbs, inability to find similarities and differences between related words, difficulty in defining words and concepts, and other similar tasks;
 - (2) impaired judgment;
 - (3) other disturbances of higher cortical function, such as aphasia (disorder of language due to brain dysfunction), apraxia (inability to carry out motor activities despite intact comprehension and motor function), agnosia (failure to recognize or identify objects despite intact sensory function), "constructional difficulty" (for example, inability to copy three-dimensional figures, assemble blocks, or arrange sticks in specific designs),
 - (4) personality change, such as alteration or accentuation of premorbid traits.
- State of consciousness not clouded (that is, does not meet the criteria for delirium or intoxication, although these may be superimposed).
- Either (1) or (2):
 - (1) evidence from the history, physical examination or laboratory tests of a specific organic factor that is judged to be etiologically related to the disturbance, or
 - (2) in the absence of such evidence, an organic factor necessary for the development of the syndrome can be presumed if conditions other than organic mental disorders have been reasonably excluded and if the behavioral change represents cognitive impairment in a variety of areas.

*From American Psychiatric Association.¹²

TABLE 2.—*Clinical Features of the Modified Hachinski Ischemia Score**

Feature	Point Value†
Abrupt onset	2
Stepwise deterioration	1
Somatic complaints	1
Emotional incontinence	1
History or presence of hypertension . . .	1
History of strokes	2
Focal neurological symptoms	2
Focal neurological signs	2

*Adapted from Rosen WG et al.²³

†A score of 4 or more is consistent with multi-infarct dementia.

senile forms of the illness are at present indistinguishable except by the age of onset—45 to 64 years for the presenile form and 65 or older for the senile type. The clinical diagnosis of either form remains one of exclusion.

Albert and co-workers^{18,19} have described dementias in terms of cortical and subcortical disorders, and classify primary degenerative dementia as one of the cortical dementias. In contrast, subcortical dementias involve psychomotor retardation and include disorders associated with lesions of the subcortical structures, such as Huntington's disease, Parkinson's disease, progressive supranuclear palsy and multi-infarct dementia.

Multi-infarct Dementia

This form of dementia accounts for 25 percent to 40 percent of dementias for which no specific treatments are available.¹³ Men are more often affected than women, and a genetic contribution has been suggested.²⁰ The earlier term "cerebral atherosclerosis" is now considered misleading because progressive involvement of cerebral arteries by atherosclerosis does not appear to lead to critical stenosis nor to produce mental impairment. Instead, multiple occlusions of small cerebral vessels result in widely distributed areas of microinfarction with concomitant mental impairment.¹¹ When it is the primary process, multi-infarct dementia can usually be differentiated by its sudden onset, focal neurological signs, frequent association with hypertension, emotional incontinence (for example, a patient having an angry outburst when confronted with a frustrating task) and stepwise decline in intellectual functioning (for example, a patient one day becomes apraxic; a week later aphasia suddenly develops).^{21,22} The clinical signs and symptoms were codified by Hachinski and associates²² in an ischemic score, which was recently modified by Rosen and co-

workers (Table 2).²³ The higher the aggregate score, the more likely the diagnosis of multi-infarct dementia. Using the scale in conjunction with appropriate laboratory tests to rule out other causes of dementia increases accuracy in differentiating these two forms of primary dementia, although diagnostic rigor is impaired by the frequent coexistence of multi-infarct and primary degenerative dementia.

Parkinson's Disease

By the time dementia develops in association with Parkinson's disease, the diagnosis is obvious. We include it here as a reminder of the increased prevalence of dementia among these patients,

TABLE 3.—*Differential Diagnosis of Dementia*

Benign senescent forgetfulness	<i>Infections</i>
Depression	Meningitis
Adjustment disorder	Tuberculosis
Paranoid states	Endocarditis
Amnesic syndrome	General paresis
Delirium	Pneumonia
Drugs and toxins	Nephritis
Antidepressants	Influenza
Lithium carbonate	<i>Cardiovascular</i>
Atropine and	Congestive heart failure
related compounds	Arrhythmia
Alcohol	Vascular occlusion
Benzodiazepines	<i>Deficiency States</i>
Barbiturates	Vitamin B ₁₂ deficiency
Bromides	Folate deficiency
Phenytoin	Pellagra
Propranolol	<i>Collagen Vascular</i>
Hydrochloride	<i>Disorders</i>
Methyldopa	Systemic lupus
Clonidine	erythematosus
Mercury	Temporal arteritis
Arsenic	Sarcoidosis
Lead	Behcet's syndrome
Organophosphates	Intracranial conditions
Carbon monoxide	Normal-pressure
Systemic illnesses	hydrocephalus
<i>Metabolic</i>	Subdural hematoma
Renal failure	Brain abscess
Hyponatremia	Tumor
Volume depletion	Stroke
Hypoglycemia	
Hyperglycemia	
Hepatic failure	
Hypothyroidism	
Hyperthyroidism	
Cushing's syndrome	
Hypopituitarism	
Hypoparathyroidism	
Hyperparathyroidism	
Addison's disease	
Porphyria	
Severe anemia	
Hyperlipidemia	

TABLE 4.—*Examples of Different Types of Memory*

<i>Memory Types</i>	<i>Function</i>	<i>Tests</i>
Immediate . . .	Attentiveness; ability to repeat new information	Ask patient to repeat a word or number
Recent	Ability to learn new information	Ask patient to remember a word and repeat it after five minutes
Remote	Ability to remember information known in the past	Ask patient to name place of birth or past presidents

which is estimated to range from 22 percent²⁴ to 40 percent.²⁵

Rare Disorders

Pick's disease is a presenile dementia that resembles Alzheimer's disease clinically but differs morphologically in having no senile plaques or neurofibrillary tangles. Affecting primarily the frontal and temporal cortex, a frontal lobe syndrome (that may include impaired attention, inability to perform acts in sequence, inertia, perseveration and impulsivity) characterizes the illness in its early stages. Although some claim the differential diagnosis can be made postmortem only, others maintain that cerebral blood flow studies provide an acceptable in vivo measure.^{26,27} *Creutzfeldt-Jakob disease*, another presenile dementia rare in the elderly, is believed to be caused by a slow virus infection. Familial cases may be due to such an infection superimposed on a genetically determined predisposition.²⁸ Clinically, it is characterized by generalized cognitive dysfunction that may be accompanied or preceded by fatigue, dizziness, apathy, irritability and confusion. Other symptoms include myoclonus, cerebellar ataxia, seizures, memory impairment and aphasia. Although *Huntington's disease* is typically accompanied by choreiform movements, the associated dementia may predate the movement disorder.²⁹ When these characteristic movements are absent, several features assist in identifying the disease, including autosomal dominant pattern of inheritance, age of onset usually in the mid-40's (but onset as late as 70 years has been reported),³⁰ prominent psychomotor retardation and loss of frontal lobe executive functions, such as problem-solving, planning and goal-directed behavior.

Differential Diagnosis

A wide variety of conditions can produce reversible dementia or clinical syndromes with a dementia-like picture. Table 3 lists many of these causes but is by no means a complete inventory. It is essential to first rule out the more common causes, such as drug effects, depression and physi-

cal illness. If pursuit of these proves unfruitful, a search for less common disorders should be undertaken, the sequence of procedures depending on the clinical circumstances of the individual case.

Benign Senescent Forgetfulness

As age progresses, memory declines to a certain degree in everyone. Impaired memory, though one of the hallmarks of aging, usually does not progress to produce the devastating deficits characteristic of dementia. Global deterioration of intellect, therefore, is not normal in the elderly. Kral³¹ introduced the term "benign senescent forgetfulness" to differentiate certain age-related memory declines from the malignant process characteristic of dementia. In benign senescent forgetfulness, according to Kral, the patient has transiently impaired recall of relatively unimportant aspects of a remote experience (such as a place, date or name) but can remember and relate the essence of the experience.³² Although Kral's specific criteria for discrimination have been criticized,³³ the concept is useful in sensitizing the clinician to different patterns of memory loss in the aged. Table 4 lists examples of different types of memory. The elderly have little difficulty in immediate memory; advancing age, however, coincides with substantial deficits in both recent and remote memory.³⁴ At the risk of oversimplifying, patients who forget where they put their glasses most likely have benign senescent forgetfulness, whereas patients who forget they wear glasses are more likely to have dementia. The elderly often benefit considerably when others help in their memory retrieval by repeating important information, or using checklists and other reminders.

Depression

The clinical presentation of depression in the elderly often mimics dementia, and this syndrome has been termed "pseudodementia."³⁵ (The subject of depression is discussed more fully in the article "Depression in Older Persons: Diagnosis and Management" by Barnes, Veith and Raskind elsewhere in this issue.) The frequency of mistak-

ing depressed for demented patients is estimated to range from less than 1 percent for cases admitted to a tertiary care referral system, to over 15 percent or 20 percent for cases in the community.^{36,37} The apathy, psychomotor retardation, impaired concentration and occasional confusion in the depressed patient may readily be taken for dementia, particularly when accompanied by complaints of memory loss. And, complaints of memory loss are common in depression; unlike those in dementia, they tend to exceed by far the actual impairment of memory observed in psychological testing.³⁸ The patient with depressive pseudodementia also tends to answer questions with "I don't know" rather than give near-miss responses or avoid questions, as is characteristic of the demented patient. Furthermore, responses on cognitive testing are reported to be inconsistent. Wells describes pseudodementia as a "caricature or burlesque, not an imitation, of dementia"³⁹ (Table 5).

The differential diagnosis is complicated by the fact that dementia and depression often coexist. Depression frequently occurs as an early symptom of dementia and may be more prevalent in the multi-infarct than in the Alzheimer type of dementia.⁴⁰ If there is doubt about the diagnosis, a trial of antidepressant medication is indicated. Even when symptoms of depression are absent, such a

clinical trial may assist in the differential diagnosis of masked depression and dementia. It may also help to reduce the functional impairment and, even without eliminating the underlying dementia, may enable the patient to function at a level compatible with community rather than institutional living.

Adjustment Disorder

With advancing age comes the increasing likelihood of loss. Bereavement due to death or moving away from friends and relatives, relocation, and other psychosocial or physiological stresses may impair mental functioning and result in the syndrome of dementia.⁴¹ Even a brief hospitalization, where unfamiliar surroundings and other anxiety-provoking events disrupt the elderly patient's daily routine, can drastically alter cognition. Assessment of the patient's life situation, therefore, is essential in the evaluation. Reduction of stress often clears up the mental deficit or, in the case of a mild pre-existing dementia, permits the person to return to his or her previous level of functioning.⁴²

Paranoid States

An estimated 10 percent of persons admitted to psychiatric hospitals after the age of 60 suffer from schizophrenia-like conditions arising for the first time late in life.⁴³ Among community resi-

TABLE 5.—*Clinical Features of Pseudodementia and True Dementia**

	<i>Pseudodementia</i>	<i>Dementia</i>
Duration of symptoms before physician consulted	Short	Long
Onset can be dated with some precision	Usual	Unusual
Family aware of dysfunction and severity	Usual	Variable† (rare in early stages, usual in late stages)
Rapid progression of symptoms	Usual	Unusual
History of prior psychopathology	Usual	Unusual
Patient's complaints of cognitive loss	Emphasized	Variable† (minimized in later stages)
Patient's description of cognitive loss	Detailed	Vague
Patient's disability	Emphasized	Variable† (concealed in later stages)
Patient's valuation of accomplishments	Minimized	Variable†
Patient's efforts in attempting to perform tasks	Small	Great
Patient's efforts to cope with dysfunction	Minimal	Maximal
Patient's emotional reaction	Great distress	Variable† (unconcerned in later stages)
Patient's affect	Depressed	Labile, blunted or depressed
Loss of social skills	Early	Late
Behavior congruent with severity of cognitive loss	Unusual	Usual
Attention and concentration	Often good	Often poor
"Don't know" answers	Usual	Unusual
"Near miss" answers	Unusual	Variable† (usual in later stages)
Memory loss for recent versus remote events	About equal	Greater
Specific memory gaps ("patchy memory loss")	Usual	Unusual
Performance on tasks of similar difficulty	Variable	Consistent

*Adapted from Wells CE: The differential diagnosis of psychiatric disorders in the elderly, In Cole JO, Barrett JE (Eds): Psychopathology in the Aged. New York, Raven Press, 1980

†Wells lists the characteristics of the later stages. In our clinical experience these manifestations are variable early in the course of dementia and are helpful in the differential diagnosis only if they are in the direction seen in later stages of dementia.

dents, the frequency is only 1 percent to 2 percent.⁴⁴ Overt psychotic symptoms often occur after a prolonged prodromal period of increased social withdrawal, suspiciousness and eccentric behavior. According to Post,⁴⁵ the typical patient is an elderly woman living alone who develops the belief that others interfere with her property. She claims they displace objects in her home, sometimes steal them, and that they talk about getting rid of her within her earshot. Many of these paranoid elderly manage to get by in their communities. Some become so disturbing to neighbors that they are finally referred to psychiatrists.

The paranoid symptoms that often accompany dementia can be mistaken for schizophrenia. Underlying dementia may thus be overlooked and inadequately diagnosed and treated. Conversely, patients who present with symptoms and signs of dementia accompanied by paranoid symptoms may, in fact, not have dementia but rather schizophrenia or another treatable paranoid disorder that often has a good prognosis if treated appropriately with neuroleptic medication.

Amnestic Syndrome

The essential feature of the amnestic syndrome is impairment of recent memory in a clear state of consciousness. Immediate memory is preserved, but the ability to learn new material is defective. For example, such patients cannot learn and remember the name of their hospital or physician, but can repeat a word or number. Although usually caused by thiamine deficiency associated with alcohol abuse, anything that can damage the diencephalic and medial temporal structures of the brain (for example, anoxia or head trauma) can cause the amnestic syndrome. Patients with this disorder often have a shallow affect, although they may appear superficially friendly and agreeable. The patient tends to fill in memory gaps with imaginary events through confabulation. Intact immediate memory and the absence of global intellectual impairment differentiates amnestic syndrome from dementia.

Delirium

Both delirium and dementia involve disturbances in cognitive functioning and thus can be confused clinically. Moreover, elderly patients with preexisting dementia are not protected against the development of delirium; in fact, the two conditions frequently coexist.⁴⁶⁻⁴⁸ Lipowski⁴⁸ has reviewed differences in some of the essential

features of delirium and dementia in the elderly: The course of delirium tends to be one of acute onset, often at night, lasting from days to weeks, while that of dementia is usually one of gradual onset with a duration of at least a month (*DSM-III* does not include this distinction¹²). Impairment of attention, alertness and perception invariably occurs in delirium and tends to fluctuate, typically with nocturnal exacerbation and lucid intervals. Dementia, on the other hand, presents without disturbance of consciousness, while perception and alertness, if abnormal, tend to remain relatively stable over time. Lipowski emphasizes that the presence of delirium in patients known or thought to have dementia requires a search for underlying causes because there is no evidence that primary degenerative dementia can cause delirium in the absence of additional causative factors. Even though patients who survive delirium have a high probability of escaping residual mental impairment, brain damage may occur as a result of the underlying cause of the delirium.

Drug Effects

Drugs deserve special emphasis in the cause of dementia in the aged. The use of various drugs by this population is pervasive, owing in part to the increased prevalence of illness of all kinds in the upper age groups. Chien and colleagues⁴⁹ surveyed 242 elderly persons living in a community in New York State. They found that these patients used a total of 301 types of medication (60 percent by prescription), with 83 percent of them taking 2 to 6 drugs each and 14 percent of them taking 7 to 15 drugs each. In addition, 14 percent of the total misused their medications because of misunderstanding of drug indications. Similar extensive use of single and multiple drug regimens among the elderly have been documented in multicenter studies in this country⁵⁰ and in Great Britain.⁵¹ Medications tend to cause toxic effects in the elderly because of age-related changes in body function and pharmacokinetics.⁵² These changes include prolonged half-life of drug, inconsistent alterations in the volume of distribution, reduced serum albumin levels resulting in occasional increases in unbound circulating drug, and decreased renal clearance.⁵³

Neuroleptic and hypnotic agents, antidepressants and sedatives, used widely in the elderly,⁵⁴ may be among the most frequent causes of drug-related treatable dementia. Numerous other drugs, including digitalis preparations, propranolol and

antihypertensive agents, have also been implicated.⁵⁵ The confusion of digitalis intoxication may be readily misdiagnosed as dementia; diuretics, producing weakness and fatigue as a result of potassium depletion, may lead to a mistaken diagnosis of primary dementia, especially in the presence of mental confusion. Alcohol abuse occurs in the elderly as well as the young and may be a cause of treatable dementia often overlooked.³⁷ Schuckit and associates⁵⁶ reported the prevalence of alcoholism to range from 2 percent to 10 percent, the higher rates among widowers and medical patients.

Systemic Illnesses

An elderly person's brain is extremely sensitive to changes in its environment, and almost any systemic illness can effect such a change and produce dementia. Table 3 lists some of the more common conditions that can present as dementia. Many of these illnesses can also appear as delirium, but the overlap is not absolute. For example, hyponatremia has been reported as a cause of delirium but not dementia.¹¹ Disorders of thyroid metabolism are the most frequent endocrinopathies that cause dementia, and both hypothyroidism and apathetic hyperthyroidism must be considered in an elderly patient with symptoms of dementia. Other common conditions include anemias due to folic acid or vitamin B₁₂ deficiency, uremia and, of course, electrolyte disturbances, particularly with the prevalence of diuretic use in the aged. Postoperative confusional states due to many mechanisms, such as low blood volume, hypoxia and sensory deprivation, are also important to keep in mind.

Malnutrition is not limited to alcohol abusers and in itself has been linked to cognitive impairment.⁵⁷ Although low income and poor health are more closely related to malnutrition than age per se,⁵⁸ many factors predispose older people to dietary inadequacies. These include financial problems, physical limitations (such as inadequate dentures) and psychological stresses (such as loneliness, bereavement or depression).

Intracranial Conditions

When recognized early enough, subdural hematomas, certain tumors (especially meningiomas) and central nervous system infections (including brain abscess, meningitis and neurosyphilis) are among the treatable causes of dementia. Postictal confusional states could conceivably present as

dementia, although delirium would be the more likely appearance. The triad of gait disturbance, incontinence and dementia suggests the diagnosis of normal-pressure hydrocephalus. The current treatment of this disorder—shunting of cerebrospinal fluid^{59,60}—has been open to question because of the high risk-to-benefit ratio of this procedure.⁶¹

Approach to Patients

History and Physical Examination

A detailed history is essential in the comprehensive evaluation of the mentally impaired patient. Because of the patient's impairment, the physician needs access to someone who knows the patient well and who can validate and supplement the information obtained from the patient. The onset of symptoms should be carefully explored with an attempt to distinguish acute from insidious onset. This distinction may be difficult to make because a traumatic event (such as retirement, bereavement or illness) may produce a considerable worsening of previously unrecognized insidious intellectual decline. Given the profound effect that medications can have on the mental status of geriatric patients, an inventory of both prescription and over-the-counter drugs is also of utmost importance.

A thorough physical examination and careful assessment of neurological status will help to identify underlying medical conditions. Illnesses ranging from myocardial infarction to Cushing's syndrome can present initially with confusion as the primary symptom.⁶² Physical examination often provides pathognomonic information. Asterixis screens for not only diseases of the liver but also a variety of metabolic diseases.¹¹ Too frequently neglected is the question of adequate sensory input. Elderly patients may appear confused or apathetic mainly because they have inadequate sensory input, and inappropriate answers to questions may result from a patient's embarrassment about disclosing a hearing impairment.

Mental Status Examination

Because dementia represents a defect in cognition, the mental status examination should focus on memory, retention and recall of new information, the ability to calculate and the quality of judgment, as well as the patient's emotional state. The physician can evaluate these functions by paying close attention to the patient's verbal and

nonverbal communications throughout the interview. The intellectually impaired elderly patient should be approached with full regard for his or her sense of dignity and wish to appear competent. Formal testing to confirm or invalidate the diagnosis of dementia can often be done subtly, in such a manner as not to insult the patient. Although such testing is best spread throughout the interview, standardized brief mental status questionnaires⁶³⁻⁶⁷ are often useful in quantifying the patient's cognitive state, especially for serial examinations aimed at following improvement or decline.

The Mental Status Questionnaire (MSQ)⁶³ is one scale used widely throughout the country (Table 6). The test consists of ten questions and takes five to ten minutes to perform. The results of the MSQ provide a numerical score, ranging from 0 to 10, that estimates the degree of brain dysfunction. Isaacs and Kennie⁶⁸ have introduced another simple instrument used extensively in geriatrics, the set test. This test asks the patient to name ten items in each of four general categories such as towns, colors, animals and fruits. For each different item named, the patient scores

one point. A total of less than 15 of the possible 40 points indicates dementia. Scores from 15 to 24 are suggestive of dementia.

The Face-Hand Test (FHT), used together with the MSQ, has been found to provide excellent diagnostic differentiation between patients suffering from general cerebral dysfunction and those without such disorders.⁶⁹ Briefly, the examiner performs two series of double simultaneous stimulations, consisting of ten trials each, one with the patient's eyes closed and the other with eyes open (Table 7). Extinction or extinguishment is the most common error and refers to one of the two stimuli not being perceived, nearly always the one applied to the hand. The second most common error and one indicating more serious pathology is that of displacement. Errors made on symmetrical stimuli (trials 5 and 6) indicate that the subject has an impairment of sensory modalities or is not able to follow instructions. The cutoff criterion indicating brain dysfunction is any error made after trial 6 in the eyes-closed series, though a person who makes errors with eyes open generally has a more severe disorder. Again, tests such as the FHT are useful primarily in alerting

TABLE 6.—*The Mental Status Questionnaire for Evaluation of Brain Dysfunction in the Aged**

Questions	Answer Interpretation	
1. Where are you now? (Name and kind of place)	Total Incorrect Answers Including Unanswered Questions: 0-2 Incorrect 3-8 Incorrect 9-10 Incorrect	Estimate of Degree of Brain Dysfunction: None or mild Moderate Severe
2. Where is this place? (Address)		
3. What month is it?		
4. What year is it?		
5. What day of the month is it? } What is the date? (Correct if within two days)		
6. How old are you? (Age in years)		
7. What month were you born?	When were you born?	
8. What year were you born?		
9. Who is President of the United States?		
10. Who was President before him/her?		

*Adapted from Kahn RL: Psychological aspects of aging, In Rossman I (Ed): Clinical Geriatrics. Philadelphia, J. B. Lippincott Co, 1971, pp 107-113

TABLE 7.—*The Face-Hand Test—Examples of Response Errors in Brain Dysfunction**

Trial	Stimulus Pair	Response	Type of Error
1	Right cheek-left hand	Both cheeks	Displacement
2	Left cheek-right hand	Left cheek, right arm	Displacement
3	Right cheek-right hand	Right cheek only	Extinction
4	Left cheek-left hand	Left cheek only	Extinction
5	Right cheek-left cheek	Both cheeks	(Correct)
6	Right hand-left hand	Both hands	(Correct)
7	Right cheek-left hand	Right cheek only	Extinction
8	Left cheek-right hand	Both cheeks	Displacement
9	Right cheek-right hand	Right cheek only	Extinction
10	Left cheek-left hand	Left cheek, left arm	Displacement

*Adapted from Fink M, Green M, Bender MB: The Face-Hand Test as a diagnostic sign of organic mental syndrome. Neurology 2:46-58, 1952

the physician to the existence of cognitive impairment. Once alerted, the physician can proceed with the required workup.

More extensive neuropsychological assessment can at times aid in diagnosis, particularly when there is a need to distinguish dementia from functional psychiatric disorder.⁷⁰ Recent studies by La Rue and Jarvik⁷¹ suggest that long-term records of cognitive function may be particularly useful and may predict the development of primary dementia 20 years before the symptoms are recognized clinically.

Laboratory Examinations

Laboratory tests should be obtained as indicated by the history and examinations, giving highest priority to the diagnosis of treatable dementia. The actual number and order of tests depend on the particular case presentation and the physician's clinical judgment. Fox and co-workers⁹ evaluated 40 patients 63 years of age and older using a series of laboratory tests, which they termed a dementia protocol (Table 8); the tests uncovered potentially treatable dementia in five of the patients. The protocol showed many laboratory abnormalities not directly related to dementia but rather to ongoing systemic disorders; adequate treatment of these disorders, however, often resulted in improvement of the dementia. Table 9 lists the minimum screening tests for evaluating dementia recommended by the Task Force sponsored by the National Institute on Aging.¹¹

Evidence of cortical atrophy on a computed tomographic (CT) scan relates more to age than to degree of dementia.⁷²⁻⁷⁵ Accordingly, the CT scan is used primarily to rule out such intracranial conditions as space-occupying lesions, hydrocephalus, hemorrhage, infarction and brain edema.

The electroencephalogram (EEG) may be helpful in determining whether there is, in fact, organic disease present, whether it is focal or diffuse, and, by serial study, whether the process is stable, progressing or resolving.⁷⁶ Slight slowing of the EEG frequencies is common in healthy elderly persons,^{76,77} but in primary degenerative dementia, the EEG is frequently abnormal with generalized slowing, the severity of which is reported to correlate with the degree of functional impairment.^{76,78,79} It should be emphasized, however, that the EEG may be normal in dementia, particularly in the early stages of the disease.⁸⁰⁻⁸²

Although laboratory investigations are essential

in the diagnostic workup of dementia, no one test or combination of tests offers a definitive diagnosis for primary dementia. Instead, they aid in excluding other conditions or else are still experimental.

Treatment

Specific Treatments

As in the treatment of any disease, the initial step involves accurate diagnosis. Specific treatment of the underlying cause may not reverse the cognitive deficit completely, but it will arrest the dementing process and often alleviate the associated symptoms. A complicating factor in treating

TABLE 8.—Results of Dementia Protocol Laboratory and X-ray Studies in 40 Patients with Provisional Diagnosis of Dementia*

Laboratory Test	Frequency of Abnormal Results	Frequency of Abnormal Results Leading to Diagnosis of Potentially Treatable Illness†
Hemoglobin	12	1
Mean corpuscular volume	5	1
Erythrocyte sedimentation rate . . .	13	..
Electrolytes	2	..
Calcium	2	..
Blood urea nitrogen	8	..
Fasting blood glucose level	10	..
Liver function tests	10	..
Protein electrophoresis	0	..
Serum vitamin B ₁₂ levels	0	..
Serum folic acid	1	..
T ₄ level	2	2
Skull x-rays	6	..
Electroencephalogram	34	1
Brain scan and nuclide angiogram . .	9	1
Cerebrospinal protein	14	3
Computed tomographic scan	4	1

*Adapted from Fox JH, et al.⁹

†N = 5 patients

TABLE 9.—Screening Tests for Evaluating Dementia*

1. Complete blood count with sedimentation rate
2. Analysis of urine
3. Stool examination for occult blood
4. Serum urea nitrogen and glucose; serum electrolytes (sodium, potassium, carbon dioxide content, chloride, calcium, phosphorus); bilirubin; serum vitamin B₁₂, folic acid
5. Tests for thyroid function
6. Serological test for syphilis
7. Roentgenogram of the chest
8. Electrocardiogram
9. Computerized tomography (CT scan) of the brain

*Recommended by the Task Force sponsored by the National Institute on Aging.

older patients is that they rarely suffer from a single disease, so that the treatment of one illness often affects other concurrent illnesses or treatments. For example, treating hypertension with methyl dopa in a patient with multi-infarct dementia may worsen a concurrent depression or further reduce cerebral blood flow, thus risking recurrent infarction. Even minor medical illness can upset a delicately maintained intellectual integrity. Elderly patients with dementia are especially vulnerable to such complications as falls, bed sores, fecal impactions and incontinence. Meticulous hygiene and treatment of multiple medical conditions are essential for optimizing remaining intellectual abilities. For most elderly patients with dementia, no specific treatment is available. Though the prognosis is bleak, the comfort and daily functioning of these patients can be improved considerably through the use of symptomatic treatments.

Pharmacological Treatments

The elderly frequently complain of insomnia because with advancing age the time required for sleep onset increases. The problem is even more severe for the elderly with dementia.⁸³ If chloral hydrate is ineffective, then a short-acting benzodiazepine, such as lorazepam, ½ to 1 mg several hours before bedtime, often relieves early insomnia and avoids the paradoxical excitement more commonly experienced with the barbiturates. Benzodiazepines with longer half-lives (for example, diazepam) should be avoided because of a tendency to accumulate in the blood. The sedative action of any of the antianxiety agents can increase withdrawal, aggravate cognitive deficits, cause confusion and worsen depressive symptoms in an elderly patient with dementia, and so must be used with caution.

Neuroleptic agents are indicated for the treatment of the agitation and paranoid symptoms that frequently accompany cognitive deficits in the aged. Low doses of a high-potency neuroleptic drug—for example, a dosage of ½, 1 or 2 mg per day of haloperidol or the equivalent dose of another neuroleptic, can be given several times a day (in divided doses) or as one dose in the early evening. Early evening doses seem to lessen daytime sedation and decrease “sundowning” (worsening agitation and confusion at night). Low-potency neuroleptic agents such as thioridazine or chlorpromazine are more likely to cause pos-

tural hypotension and tachycardia, which can be dangerous in the elderly, especially in those with already compromised cardiac status.

Antidepressants are useful for the treatment of depressive symptoms (particularly insomnia) occurring in patients with dementia, aside from the therapeutic trial of antidepressants indicated when pseudodementia is suspected. Side effects can be minimized by using lower dosages that are increased gradually, such as 25-mg increments of doxepin or desipramine, which are increased every few days. Daily dosages necessary for a therapeutic effect can range from as low as 25 mg to more than 150 mg but rarely as high as 200 mg. Giving the drug in divided doses throughout the day lessens the common side effects of postural hypotension and anticholinergic symptoms (such as dry mouth or urinary retention). All tricyclic drugs, except perhaps doxepin, appear to prolong both atrial and ventricular depolarization, an important consideration when treating patients with concurrent disease of cardiac conduction.⁸⁴ A wide variety of investigational compounds have been studied and many have been used clinically. As yet, pharmacologic efforts to increase intellectual functioning have been disappointing. Case reports of the efficacy of cerebral vasodilators often fail tests of replication and double-blind study design.

Hydergine (dihydrogenated ergot alkaloids), not primarily a cerebral vasodilator, has offered some promise in improving mood and self-care.⁸⁵ These improvements, however, have been inconsistent and of questionable clinical significance.⁸⁶ Another approach has been to enhance cholinergic activity in the brain. Autopsies on subjects with primary degenerative dementia have demonstrated a reduction in choline acetyltransferase, which is consistent with central cholinergic deficit.^{87,88} Furthermore, preliminary trials of cholinergic agonists have improved memory in young and old normal volunteers.⁸⁹⁻⁹¹ However, trials of these agents, including physostigmine,^{92,93} choline⁹⁴ and lecithin,⁹⁵ have shown no effect on memory in patients with dementia.

The psychostimulant methylphenidate has been reported to cause global improvement in elderly patients with depression and cognitive impairment,^{96,97} although these reports have been criticized on methodological grounds.^{98,99} A possible justification for the use of psychostimulants lies in the recent work of Bondareff and associates,¹⁰⁰ which showed a deficiency of noradrenergic cells in patients with primary degenerative dementia. A

recent well-controlled trial suggests that improvement of apathy and withdrawal results from treatment of underlying depression rather than treatment of cognitive impairment per se.¹⁰¹ Experiments with animals in which neuropeptides (adrenocorticotrophic hormone [ACTH]-analogues) were used have shown some promise in enhancing mental functioning.¹⁰² DeWied and co-workers¹⁰³ maintain that ACTH and its analogues have short-term effects on arousal and attention. So far, neither peripheral endocrine effects nor improved intellectual functioning have been detected in humans. Other agents and treatments under investigation but not yet shown to be effective include procaine hydrochloride, piracetam, and hyperbaric oxygen.^{104,105}

Environmental Management

The sensitivity of intellectually impaired elderly patients to their surroundings requires optimal stimulation. Too much or too little environmental stimulation may result in withdrawal or agitation. Either of these results, when extreme, can make the difference between institutional care and functioning in the community.

Patients with dementia do best in familiar and constant surroundings. Daily routines increase their sense of security. Prominent displays of clocks and calendars, nightlights, checklists and diaries all aid in their orientation and memory. Medication schedules must be kept as simple as possible. Moves should be avoided, but, if necessary, photographs and other familiar objects from the patient's previous home should be placed nearby in an effort to create a home-like environment. Frequent family visitors and access to current events through newspapers, radio and television are also important to maintain the patient's awareness of the environment.

Family Support

Another essential aspect of management is support for and from family members. Education and counseling about the nature of the patient's illness, from the beginning, encourages family involvement in the patient's treatment. Uninformed relatives may react with anger and puzzlement to the emotional lability characteristic of so many demented patients. The patient's loss of inhibitions, emotional and verbal, as well as physical incontinence, may cause embarrassment to the family and be misinterpreted as willful behavior demonstrating lack of love or concern.

Psychotherapy

Both patient and family often benefit from psychotherapy. The physician can provide information about the nature of the illness and about ways to cope with intellectual deficits. Patients often need help in grieving and accepting their disability as well as support in maximizing remaining abilities and adaptive skills. Psychological support for caretaking persons will lighten their emotional burden. Anger, guilt, frustration and helplessness are all natural responses to the task of caring for a once vital and now deteriorating loved one. The relatives often need reassurance that such reactions are common and that discussing them can offer some relief.

Conclusions

Dementia, then, is not part of normal aging. Some 80 percent to 95 percent of persons 65 years and older never become demented. When dementia develops, therefore, physicians must pursue an adequate differential diagnosis and focus on a search for treatable disorders. In fact, a treatable cause will be found in 10 percent to 20 percent of cases. Even though the most frequent types of dementia, primary degenerative and multi-infarct dementia, have no specific treatments, palliative measures and symptomatic management can ameliorate the suffering of both patients and their families.

Dementia is defined with regards to a person's intellectual, social and occupational functioning, and the patient with dementia generally demonstrates a graduated decrement in these faculties. The physician can maximize the patient's functioning through not only medical and pharmacological interventions but also through environmental management and support of the patient's family. The goal is to help the patient when such help is needed, but not to take away opportunities for self-care when limited self-care is possible.

There is probably no experience as desperate as hearing that nothing can be done to stop the process. In this respect, dementia resembles cancer but usually runs a longer course; reports of dementias lasting 20 years are not unusual. The demented patient, moreover, is more helpless than the cancer patient when unable to participate in his or her own treatment decisions, and too often the able patient is not consulted. Even the most severely demented patient maintains some awareness of the environment, and this usually

includes awareness of cognitive deficits. The prevalence and degree of suffering of both patients and their families attest to the need for conscientious and humane treatment while awaiting results of research that will provide more effective therapies for this devastating illness.

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